

## A New and Remarkable Colletid Bee

By TARLTON RAYMENT, F.R.Z.S.

(Plate xl)

While working on a collection of small leaf-cutting bees from New South Wales, the author was more than surprised to find a very remarkable male with the general aspect of a *Megachile*, but which proved, on critical examination, to have no relation whatever to that genus and to be the genotype of a new one.

It is a very strange insect, for it combines in itself the distinctive characters of several other genera, and the morphologist is thus able to identify the elements of structure present in the highest bees. The tracing of homologous structures in comparative anatomy is, perhaps, one of the most interesting and informative phases of biological research.

To enable the student to appreciate better the unique character of this insect and assist him in the easy identification of the new genus, the author has compared the characters in some detail with those of other genera. The illustrations appended to the generic diagnosis will preclude any possibility of error in determination.

### Family COLLETIDAE.

#### PROTOMORPHA, genus nov.

**Genotype:** *P. tarsalis*, sp. nov.

The general facies is that of a black *Megachile* some 7 mm. in length, ornamented with much long white hair; the abdomen is small and ovate, with the terga coarsely punctured and the posterior margins broadly depressed; the head, too, is rather large; with a very strong resemblance to species such as *M. gilbertiella* Ckll.

The mouth-parts are, however, very different, for the glossa is exceedingly short and broad; there are four stout segments in the labial palpus, and six of almost equal length in the maxillary palpus; the maxillae are large and strong. The mandibles are acute, but nevertheless bidentate, and arcuate. All these characters fit the male of certain *Paracolletes* such as *P. pusillus* Ckll.

The metathorax is large, and the dorsum coarsely sculptured with large anastomosing rugae almost forming conspicuous pits; a structure very similar to that of *Binghamiella antipodes* Sm. The angles of truncation, too, are produced to small teeth as in that genus, which shows, perhaps, some approach to the new bee.

The legs are, however, of a remarkable type, and utterly unlike the slender legs of *Binghamiella*. The tarsi are short and broad, the basitarsus, however, nothing less than astonishing, for it is triangular, and deeply concave; a form seen clearly in the highly evolved social bees, *Trigona carbonaria* Sm. The tibiae undoubtedly exhibit a homologue of the honey-bee, for they have a well-defined groove that is unmistakably the elements of the harvesting corbiculae of the highest of all bees, *Apis mellifera* L. There is also a conspicuous pecten along the apical margin of the tibiae to strengthen the likeness to *Apis*, while the hind calcaria leave no doubt whatever that they are homologous with the pecten of the hive-bee.

The author (1935) had already traced the evolution of the pecten, with diagrams showing its gradual development from the calcariae of the solitary wild bees, and there could be no more striking evidence in support than that provided by the new species. A glance at the diagrams will convince the most sceptical.

Many species in the genus *Nomia* have expanded tibiae and tarsi, and *Goniocolletes*, too, has many hooks and concavities, but they are all far removed from those of the new genus.

The neuration of the wings approaches that of *Halictus*; there is a large pterostigma (inconspicuous in *Paracolletes*) with three cubital cells, the

second being small and somewhat contracted at the top; the third not quite so long as the first. The basal nervure is strongly arched as in *Halictus*.

The new genus approaches *Binghamiella*, but the hair is not conspicuously plumose. The mouth-parts are undoubtedly collectiform, and the bee is, therefore, placed in the Family Colletidae, but it is very unfortunate that no details of the biology are available to assist the taxonomist, for the unique character of the legs and the calcariae leads the author to postulate that the "nest" would not be excavated in the ground after the habit of fossorial bees.

#### PROTOMORPHA TARSALIS gen. et sp. nov.

Type, Male—Length 7 mm. approx. Black, bright, with much white hair.

Head extremely short, practically circular from the front; face entirely masked with long silvery-white plumose hair; frons shining, close punctures of medium size; a fine carina; clypeus closely punctured, punctures somewhat pyriform; supraclypeal area similar to clypeus (it is difficult to examine); vertex with punctures contiguous; rather large ocelli in a low curve; distance from compound eye to lateral ocellus not quite twice the diameter of the latter; compound eyes converging slightly below; genae striato-punctate with much white hair; labrum a small narrow oval (colletiform), black, polished; mandibulae acute, but bidentate, obscurely reddish, black basally; antennae with short slender scapes, with shallow punctures; flagellum long and filiform, three basal segments shortest, apex acute.

Prothorax not visible from above; tubercles black, with a fringe of long white hair; pleura shining, closely punctured, with much long white hair; mesothorax with many punctures, but shining between; long white hair; scutellum long, polished, with scattered punctures, and long white hair; postscutellum rough, bright, with a low tubercle, and similar hair; metathorax shining, a large area with a few coarse rugae forming deep pits, beyond the area the pits are circular and very much smaller, angles of truncation convex, and produced to a minute tooth, much white hair; abdominal dorsal segments shining, punctures contiguous, posterior margins broadly depressed and somewhat pallid, with fringes of long white hair, ventral segments much contracted, very bright, a few punctures, light fringes of white hair, fifth with a long conspicuous comb of long curved amber setae which extends back over the depressed apical segments which look like those of a female, and somewhat pallid.

Legs very remarkable, black, obscurely brown, some white hair; the anterior coxae very large and femora thick, anterior tibiae with an amber line anteriorly and distally, basitarsus rather narrow; medium femur stout, the basitarsus broader, and black; posterior legs very stoutly formed; femora curved, triangulate, highly polished, and nude on the inner surface; some white hair above; posterior tibiae curved, stout, nude on the under surface, which has a microscopic duller tessellation, the apical third with a conspicuous curved ctenidium of eight spines, the longer calcar forming the ninth; on the upper surface is a lineate grooved area undoubtedly homologous with the corbicula of the hive bee, the white hairs are hardly barbed; the posterior basitarsus is short, triangular, and the deep hollow on the exterior surface is aligned with the corbicula of the tibiae; a small but strong ctenidium distally; the second segment is small but stout; tarsi amber, short, triangular, some golden hair; claws reddish-amber, short, bifid, pulvillus small; hind calcar amber, one very long, curved, practically simple, the other excessively short, and of a compound form of four spines bent at a right angle, and pallid; tegulae polished, black; wings hyaline, iridescent, more angulate than curved; especially the posterior one; nervures brown, the first recurrent entering the second cubital just before its middle, the second recurrent practically meeting the third intercubitus; cubital cells three, the first largest, the second smallest, somewhat contracted at the top, the third almost as long as the first; pterostigma conspicuous blackish; hamuli about eight.

Locality: Caldwell, New South Wales, 21st Dec., 1951, leg. V. Robb.

Type in the collection of the National Museum, Melbourne.

Not close to any described species; a remarkably distinctive bee not to be confused with any other.

#### EXPLANATION OF PLATE.

1. Adult male bee *Protomorpha tarsalis*, gen. et sp. nov.
2. Genitalia of the male.
3. Lateral view of portion of the head with mouth-parts extruded.
4. Rugose dorsum of the metathorax.
5. The compound calcariae of the posterior leg.
6. Strigilis of the anterior leg of the male.
7. Tarsal segments of the anterior leg.
8. The four stout segments of the labial palpus.
9. Mouth-parts showing the short broad glossa.
10. One of the paraglossae at higher magnification.
11. Pharyngeal plate: the ducts of the pharyngeal gland (marked with an arrow) are very poorly developed.
12. Galea and maxillary palpus much enlarged: note the maxillary comb.
13. The short wide labrum bears a long fimbria.
14. Ventral view of the apical segments of the abdomen to show the long fimbria on the gaster.
15. The stout posterior leg bears a corbicula which also extends to the first tarsal segment.
16. Bidentate mandible of the male.
17. The large punctures of the abdominal terga have many microscopic punctures interspersed.

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### Corrigendum

Australian Zoologist, Vol. xii, Aug. 1956. Owing to an engraver's error, the block for Nos. 6, 12, 18, 24 (p. 182) was detached from Fig. 3 (Pollen-grains), although the legends for these items appear in their proper sequence below; consequently, as a corollary of the transposition, the block for Fig. 6 (Details of the Bee) included the pollen-grains Nos. 6, 12, 18, 24 without any explanatory legend.

—Tarlton Rayment.